

REMARKS/ARGUMENTS

Status of the claims

Claims 1-32 are pending, with Claims 1 and 31 being independent. Claims 19-21, 26-30 and 32 have been withdrawn. Claim 18 has been canceled, and its subject matter has been incorporated in Claim 1 for the reasons explained hereinafter. Claims 1-9, 11-17, 22-25 and 31 have been amended.

The Examiner's indication of allowability of Claims 12 and 13 is noted with appreciation. However, in view of the following remarks which establish the patentability of claim 1, these claims remain indirectly dependent from Claim 1.

Overview of the office action

The specification has been objected to under 35 USC 112, first paragraph, as being replete with terms that are not clear, concise and exact.

The title of the invention was found to be "not descriptive."

Claims 1-32 were objected to for various informalities.

Claims 1-5, 15, 16, 18, 24, 25 and 31 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto in view of Laskin. Claims 6, 7, 14 and 17 stand rejected under 35 U.S.C. 103(a) as unpatentable over Matsumoto and Laskin, and further in view of Richmond. Claims 8 and 10 stand rejected under 35 U.S.C. 103(a) as unpatentable over Matsumoto in view of Laskin and Richmond, and further in view Conwell. Claims 8 and 10 stand rejected under 35 U.S.C. 103(a) as unpatentable over Matsumoto in view of Laskin and Richmond, and further in view of Conwell. Claims 9 and 11 stand rejected under 35 U.S.C. 103(a) as unpatentable over Matsumoto in view of Laskin and Richmond, and further in view Mizoguchi. Claims 22 and 23

stand rejected under 35 U.S.C. 103(a) as unpatentable over Matsumoto in view of Laskin, and further in view of Schmidt.

Amendments addressing section 112 issues and formalities

Various changes have been made hereinabove to the specification, and it is believed to now be written in "full, clear, concise, and exact terms", as required by 35 U.S.C. 112, first paragraph. However, if any informalities were inadvertently missed, the Examiner is respectfully invited to point them out to the undersigned.

Applicants accept with appreciation the Examiner's suggested title.

Claims 1-32 have been reviewed with regard to grammatical and non-idiomatic informalities, and suitable corrections have been made thereto hereinabove. Also, Claim 7 has been amended to clarify the recited terminology questioned by the Examiner. In particular, the maximum limited UV irradiation is whichever is lower of a first irradiation, which is based on power consumption, and a second irradiation, which is based on life span of the light irradiation section.

With regard to Claim 12, it correctly recites the inventive structure. An abnormal condition occurs when either of the specified conditions occurs, or both. If the Examiner is of a contrary opinion, then a detailed explanation referring to specific portions of the specification would be appreciated.

It is believed that the specification and claims, as now presented, are free from the noted informalities. Accordingly, withdrawal of the Examiner's objections is respectfully requested.

Summary of subject matter disclosed in the specification

The following descriptive details are based on the specification. They are provided only for the convenience of the Examiner as part of the discussion presented herein, and are not intended to argue limitations which are unclaimed.

An ink jet printer is capable of producing in-situ polymerization of cationic polymerization ink with a source emitting ultraviolet (UV) light which irradiates the ink placed onto the recording medium. Curing (polymerizing) of this type of ink is a function of humidity. (See page 1, last four lines and page 2, first nine lines). Elevated levels of humidity impede and negatively affect the curing process. The need to heat the recording medium is reduced, thereby avoiding its adverse effects of shrinking and distorting the recording medium, by controlling the luminance, or intensity, of a UV source in response to the detected humidity level.

Patentability of independent claims 1 and 31 over the prior art

Claim 1 has been amended to explicitly recite "a controller for controlling irradiation of the UV light to be irradiated from the UV irradiation section on the basis of detected humidity." This limitation has been imported into Claim 1 from Claim 18. Thus, Claim 18 has been cancelled.

Neither Matsumoto nor Laskin teaches or suggests "a controller for controlling irradiation of the UV light to be irradiated from the UV irradiation section on the basis of detected humidity" as recited in amended claim 1.

The objective of Matsumoto is to provide an ink jet printer in which ink can be dried quickly after printing operation. See column 1, lines 50-54 and col. 5, lines 16-19. In order to

attain this objective, Matsumoto discloses a thermal head 22 which precedes ink jet head 23 along the travel direction of recording material 17. Thermal head 22 has a plurality of heating elements 27 which are used to preheat the recording material 17. Drive data is provided for individually driving the heating elements 27. A key feature of this reference is that the drive data for preheating energy generated by the heating elements is determined in accordance with the ejected amounts of ink from the ink jet head. See column 5, lines 20-33. A higher heat energy is applied where the total of the ejected amounts is high. See col. 7, lines 36-39.

The Examiner contends on page 5 of the Office Action that Matsumoto teaches

"A controller (31) for controlling the irradiation of the light on the basis of the detected humidity. (See col. 12:25-39, which discusses controlling output of drying units based upon humidity detected by humidity sensor, col. 13:37-59, which discusses control of IR diodes based on humidity and col. 14:39-56, which discusses control of UV light based on humidity)".

What Matsumoto discloses in col. 12 is that drive data for a thermal head 22 (FIG. 1) is compensated according to output signals of a humidity sensor S2. However, the ink of Matsumoto is not disclosed to be of the type which includes a cationic polymerization component. Moreover, this embodiment of Matsumoto does not utilize a UV light, nor is the intensity of a UV light source controlled on the basis of detected humidity for curing ink that includes a cationic polymerization component, as recited in amended Claim 1.

To summarize, this embodiment of Matsumoto aims to quickly dry ejected ink by suitably preheating the recording material 17 with heating elements 27. Key considerations include the following:

1. The ink in Matsumoto is not of the type which includes a cationic polymerization component. In contrast, the present invention utilizes an ink of this type.
2. Matsumoto does not irradiate the ejected ink with UV light. In contrast, the present invention

utilizes an light source of this type.

3. Matsumoto controls heat applied via heating elements 27 based on the amounts of ejected ink.

In contrast, the present invention controls the luminance of the UV light source.

4. In Matsumoto, the humidity sensor affects the heat applied via heating elements 27. In contrast, the present invention utilizes a humidity sensor to control the UV light source.

5. In Matsumoto, the humidity sensor compensates the heat applied via heating elements 27. In contrast, the present invention controls the UV light source based on humidity.

Thus, a wide gap exists between the present claimed invention and Matsumoto.

Laskin discloses the use of ink that includes a cationic polymerization component. Moreover, Laskin recognizes the detrimental effect of high humidity levels on curing such an ink. To solve this problem, Laskin teaches "materials used in fast curing cationic inks and coatings which are insensitive to humidity". See column 2, lines 13-15. Laskin is absolutely silent and, therefore, provides no suggestion as to "controlling irradiation of the UV light to be irradiated from the UV irradiation section on the basis of detected humidity" as recited in claim 1. Thus, Laskin cannot bridge the gap between the present claimed invention and Matsumoto.

Accordingly, the combination of Matsumoto and Laskin does not obviate the claimed invention since neither of these references discloses, teaches or suggests controlling irradiation of the UV light on the basis of detected humidity, as recited in amended Claim 1.

The embodiment disclosed in col. 13 of Matsumoto utilizes IRLDs (infrared laser diodes) as the heat source. See column 13, line 38. The heat applied by the IRLDs is controlled according to the ejected amount of ink. See column 13, lines 49-51. The Examiner contends that "col. 13:37-59 ... discusses control of IR diodes based on humidity". However, contrary to the Examiner's statement, nowhere can such a discussion be found in Matsumoto concerning this

embodiment. If the Examiner maintains his view, then he is respectfully requested to quote the wording being relied upon for this conclusion and to specify where in Matsumoto it appears. It is respectfully submitted that there is no such disclosure in Matsumoto.

In any case, even if Matsumoto were to include such a teaching for the embodiment in question, the present claimed invention is still allowable for the reason, *inter alia*, that this reference has no disclosure or even a hint at the use of an ink of the type which includes a cationic polymerization component. Moreover, this embodiment does not use a UV source which is controlled in response to humidity. Thus, the present claimed invention is clearly allowable over this embodiment in combination with Laskin.

In another embodiment relied on by the Examiner, Matsumoto discloses an ultraviolet emitting laser unit (UVL) 152. See column 14, line 40. "[T]he ultraviolet emitting laser unit 152 is controlled ...according to an ejected amount of and ink droplet 156." See column 14, lines 45-48, FIG. 19. The Examiner contends that "col. 14:39-56 ... discusses control of UV light based on humidity". However, contrary to the Examiner's statement, nowhere can such a discussion be found in Matsumoto concerning this embodiment. If the Examiner maintains his view, then he is respectfully requested to quote the wording being relied upon for this conclusion and to specify where in Matsumoto it appears. It is respectfully submitted that there is no such disclosure in Matsumoto.

In any case, even if Matsumoto were to include such a teaching for the embodiment in question, the present claimed invention is still allowable for the reason, *inter alia*, that this reference has no disclosure or even a hint at the use of an ink of the type which includes a cationic polymerization component. Thus, this embodiment of Matsumoto does not use a UV source to control the curing of such an ink in response to humidity. Thus, the present claimed

invention is clearly allowable over this embodiment in combination with Laskin.

Various other secondary references have been applied in rejecting the dependent claims. However, none of these additional secondary references can serve to bridge the gap between the present claimed invention and Matsumoto. Thus, Claim 1 is allowable over all such references when applied singly or in combination.

Method Claim 31 includes features presented above as distinguishing Claim 1 over the applied references and, thus, is allowable as well. Therefore, Claims 1 and 31 are patentable.

Patentability of dependent claims

Each of Claims 2-5, 15, 16, 24 and 25 depends from allowable Claim 1 and, thus, benefits from its allowability.

Conclusion

Based on the above, it is respectfully submitted that the present application is now in proper condition for allowance. Favorable action to this effect is respectfully solicited.

It is believed that no fees or charges are required at this time in connection with the present application. However, if any fees or charges are required at this time, they may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,
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